USDA
NATURAL RESOURCES
CONSERVATION SERVICE

MARYLAND CONSERVATION
PRACTICE STANDARD

WETLAND RESTORATION

CODE 657
(Reported by Acre)

DEFINITION

The rehabilitation of a drained or degraded wetland where the soils, hydrology, vegetative community, and biological habitat are returned to the natural conditions to the extent practicable.

PURPOSE

This practice may be applied for one or more of the following purposes:

1. To create or enhance wildlife habitat;
2. To provide offsite water quality benefits;
3. To provide other natural wetland functions.

CONDITIONS WHERE PRACTICE APPLIES

Restoration applies to rehabilitating natural wetlands which were hydrologically and/or vegetatively manipulated in the past. These sites may have been completely converted to non-wetland conditions by filling, draining, or other hydrologic changes, or they may still meet wetland criteria but have impaired functions due to hydrologic or vegetative modifications.

This practice is applicable only if the site will be restored, as nearly as possible, to the original hydrologic conditions and plant communities which are likely to have existed before the wetland was modified.

This practice does not apply to:

1. Sites where a wetland will be restored and maintained with a hydrologic regime and/or plant community different from those which previously existed before the wetland was modified. (Refer to the Maryland conservation practice standard for Wetland Creation, Code 658.);
2. Sites where a wetland will be created in a location which historically was not a wetland. (Refer to the Maryland conservation practice standard for Wetland Creation, Code 658.);
3. Sites where a wetland will be constructed to treat significant point and non-point sources of water pollution. (Refer to the conservation practice standard for Constructed Wetland, Code 656.)

CONSIDERATIONS

Consider the long-term land use objectives of the client. If the client is interested in providing wildlife habitat, consider the wildlife species or groups of species to be supported and the habitat needs which can be met on the managed area.

Consider the natural availability of plant species in the soil seed bank vs. the need for planting in the restored wetland and upland buffer.

Consider designing the site to maintain permanent or semi-permanent shallow surface water in at least 20% of the wetland. This will benefit resident wildlife such as waterfowl, wading birds, frogs, toads, salamanders, and turtles that need a long-term water supply.

Consider the adverse impacts of nearby populations of nuisance wildlife such as muskrats, beavers, or resident geese, on the establishment and maintenance of the site. Also consider the potential for attracting nuisance wildlife into an area.

Take note of other constraints such as economic feasibility, access, regulatory or program requirements, social effects, and visual aspects, such as compatibility with the natural landscape. Specific cost-sharing programs or other funding

sources may impose criteria in addition to, or more restrictive than, those specified in this standard.

Consider long-term maintenance requirements of the restored wetland.

Refer to Chapter 13 of the Engineering Field Handbook for further discussion of these planning considerations. Refer to the Maryland Wildlife Biology and Management Handbook for additional habitat considerations for wildlife species.

CRITERIA

General Criteria

Erosion and Sediment Control - Construction operations shall be carried out in such a manner that erosion will be controlled and water and air pollution minimized both on-site and off-site. State and local laws concerning pollution abatement shall be followed. Construction plans shall detail erosion and sediment control measures to be employed during the construction process.

Site Preparation - Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other debris shall be removed from embankment fill.

All cleared and grubbed material shall be disposed of outside the limits of the wetland and wetland buffer. When specified, stockpile a sufficient quantity of topsoil in a suitable location for use on the embankment and other designated areas. Selected woody debris shall also be stockpiled for use within the restored wetland, when specified.

Final Grading - All upland borrow areas shall be graded to provide proper drainage and left in a stable condition.

Permits - Federal, state, and local regulations may significantly limit activities in or adjacent to streams, wetlands and other aquatic areas. Laws pertaining to protection of streams, wetlands and water bodies, and erosion and sediment control may be applicable. Permits or approvals from federal, state, or local government agencies, if needed, shall be obtained before any work is performed.

Additional Criteria to Restore Hydrology

General Requirements - On at least 70 percent of the wetland area, wetland hydrology (including natural microtopography of the soil surface) shall be restored as nearly as feasible to the conditions that originally existed on the site. The minimum hydrologic conditions of the restored wetland shall meet current NRCS criteria for wetland hydrology. The depth, duration, and frequency of surface and/or ground water in the wetland shall be capable of supporting a prevalence of hydrophytic vegetation.

Up to 30 percent of the wetland area may be restored and maintained as shallow open water and/or have wetland hydrology different from that which originally occurred. The purpose of this modification shall be to support a diverse plant and animal community.

The size and character of the watershed above the site shall be assessed under present and future conditions in order to determine available hydrology.

Hydrology may be restored by using a variety of measures, including but not limited to embankments, surface drain plugs, subsurface drain plugs, removal of fill material, and shallow excavation. These measures may not be needed on restoration sites where the natural hydrology has not been significantly modified.

On sites that have been in long-term agricultural use, grading and shaping shall be used as needed to restore the diverse microtopography that occurs naturally in wetlands.

A soils investigation shall be performed to determine conditions for minimizing seepage losses; suitability of materials for embankment construction; adequacy of subsurface water supply; and capability to support desired plant materials, as applicable.

After the site is restored, the soil shall generally remain undisturbed so that the wetland will perform its natural functions, including (but not limited to) accumulation of organic matter, nutrient and contaminant sequestation, and

retention of surface and subsurface water.

Embankments - Embankments may be used to impound water and provide wetland hydrology. Embankments that meet the definition and criteria for an embankment pond (as described in the Maryland conservation practice standard for Pond, Code 378) are not included as components of this standard. Fills that will be entirely within a surface drainage ditch shall be designed according to the criteria for Surface Drain Plugs, as described in the next section of this standard.

Embankments shall be less than 4 feet in height, with a minimum top width of 4 feet. Combined upstream and downstream side slopes shall be a minimum of 6:1, with neither slope steeper than 2:1.

When necessary, appropriate measures shall be taken to minimize seepage losses through the embankment and subsoil.

Spillways **-** Spillways shall be provided for safe passage of water. Pipe conduits and vegetated spillways shall be designed according to the Engineering Field Handbook. The minimum diameter for pipe conduit spillways is 6 inches. Trash racks are required on inlets to pipe conduit spillways.

Spillway(s) shall be designed to pass the 10-year, 24-hour storm. Provide a minimum of 0.5 foot of freeboard above the 10-year flow depth, and a minimum of 1 foot between the normal pool elevation and the top of the embankment.

When there is no surface inflow entering the wetland from off-site (i.e., no drainage area), spillway(s) shall be designed to release the volume of the 10-year, 24-hour storm within an appropriate amount of time for survival of the wetland plant community. The amount of time needed for release of excess water from a specific site shall be determined based on the depth of inundation and the species of wetland plants desired on the site. Generally, wetland plants can tolerate excess inundation for periods of five consecutive days or more during the growing season. A minimum of 0.5 foot of freeboard shall be provided above the 10-year rainfall depth.

Surface Drain Plugs - In areas where open ditches were constructed to provide drainage, wetland hydrology may be restored by constructing surface drain plugs, using a pipe riser or other structures within the ditch to control the water level, or by filling a surface drain to the original ground line. Refer to the criteria for Embankments when fill will be placed on the ditch banks.

Provisions shall be made to store, pass through or divert excess runoff. Use the Engineering Field Handbook, Chapter 14, to design the structure capacity.

All fill shall be relatively impermeable and be compacted to achieve the density of adjacent materials. Crown the fill a minimum of one foot above the top of the lower existing channel bank to account for settling.

The minimum length of surface drain plugs shall be (6H + 4) feet. "Minimum length" refers to the length as measured along the top of the plug. "H" is measured from the settled top of the embankment to the low point along the centerline of the embankment (fill).

Subsurface Drain Plugs **-** In areas where subsurface drains were used to lower the water table, wetland hydrology may be restored by removing or plugging the drain or replacing the perforated drain with a non-perforated drain.

The minimum length of drain to be removed or plugged shall be as follows:

Length of Drain	Average Hydraulic Conductivity of Soil
50 feet	<0.6 inches/hour
100 feet	0.6 to 2.0 inches/hour
150 feet	>2.0 inches/hour

All envelope filter material or other flow enhancing material shall also be removed for this length. The trench used to alter the drain shall be filled and compacted to achieve a density equal to adjacent natural soil material.

When subsurface drains also function as outlets for other drained areas where drainage is still desired, appropriate measures must be

incorporated to keep the upstream drainage systems functional. A non-perforated pipe shall replace the perforated pipe through the wetland area to be restored, and shall extend beyond the wetland in all directions at least the minimum length previously specified for length of drain to be removed or plugged. Drains may also be re-routed around the wetland at the same minimum distances from the wetland, or where topography permits, setting a water control structure at a level that does not affect upstream drainage.

A water control structure may be placed on the inlet of an existing drain. The water control structure shall be attached to a non-perforated conduit that extends at least the minimum length previously specified for length of drain to be removed. The connections of the water control structure and the non-perforated pipe shall be watertight.

Stabilization of Structural Measures - Embankments and surface drain plugs shall be vegetated according to the following criteria:

1. Slopes steeper than 4:1, and vegetated spillways - Specify site treatment and plantings according to the Maryland conservation practice standard for Critical Area Planting, Code 342. When feasible, select plant species that are native to Maryland and/or beneficial to wildlife;

2. Slopes 4:1 or flatter - For optimum wildlife habitat on most sites, specify seeding mixes in accordance with the Maryland conservation practice standard for Conservation Cover, Code 327. In lieu of permanent seeding, natural regeneration may be used if all of the following conditions are met:

   a. There is an adequate natural seed source of desired species in adjacent areas or in the soil seedbank;

   b. Site conditions are favorable for establishing the desired number and distribution of plants within a specified time period;

   c. Noxious or invasive species are not likely to jeopardize the natural regeneration process; and,

   d. A nurse crop of 20 pounds per acre of annual ryegrass (not cereal rye), or 40 pounds per acre of oats, wheat, or barley, is planted to provide temporary cover.

   If dense permanent cover is needed in a short period of time (e.g., the site will be intensively used, severe site conditions are present, or significant erosion control is needed), then use the Maryland conservation practice standard for Critical Area Planting, Code 342, to specify the appropriate site treatment and plantings.

Removal of Fill Material - Where a wetland has been filled by sediment, land shaping, or other activities, the hydrology may be restored by removing the fill material from the site. Fill material shall be removed to the top of the buried hydric soil, placed on an upland site, and stabilized so that no erosion of the material occurs.

If hazardous wastes are suspected in the fill material, collect soil samples and test for the presence of hazardous waste in accordance with local, state, and federal requirements. Sites containing hazardous wastes shall not be restored under this standard unless the appropriate hazardous waste authority determines that the site can be decontaminated.

Shallow Excavation - A wetland may be restored by excavating below the existing ground surface to create a shallow basin that will hold surface water and/or intercept groundwater. The basin shall permit storage of water at a depth, frequency, and duration as closely as possible to the original hydrologic conditions on the site.

Additional Criteria to Restore Vegetation

General Requirements - Select vegetative cover to accomplish the intended purpose of the practice and the objectives of the client. Plant types and species shall be selected based on their compatibility in growth rates, shade tolerance, moisture requirements, and other characteristics. Herbaceous and/or woody plants may be appropriate. For best results, use species and varieties with proven conservation traits.

Select plant species that are native to Maryland, or are introduced and are non-invasive (i.e., not likely to spread beyond the planted area and displace native species). In the wetland area, the

use of Maryland native species is required for all permanent plantings (not including temporary seedings or nurse crops). In the buffer area, the use of species native to Maryland and/or beneficial to wildlife shall be encouraged when feasible.

Site preparation and planting to establish vegetative cover shall be done at a time and manner to insure survival and growth of selected species. Provide supplemental moisture if and when necessary to assure early survival and establishment of selected species.

Only viable, high quality seed and planting stock shall be used. The method of planting shall include hand or machine planting techniques, suited to achieving proper depths and placement for the selected plant species.

All plant materials shall be correctly handled before planting. In general, plant rooted and unrooted materials as soon as possible after receiving them from the supplier. For bare-root seedlings, keep the roots moist at all times and keep the plants out of direct sunlight as much as possible.

Keep seed cool and dry until planting. Except for grasses, seeding is usually not a preferred method for wetland plant establishment, due to the lack of information about seed viability, germination, and seedling growth requirements for the majority of wetland plant species.

In the wetland and buffer, natural regeneration may be used if all of the following conditions are met:

1. There is an adequate natural seed source of desired species in adjacent areas or in the soil seedbank;

2. Site conditions are favorable for establishing the desired number and distribution of plants within a specified time period; and,

3. Noxious or invasive species are not likely to jeopardize the natural regeneration process.

Use planting as appropriate to hasten establishment of desired species or supplement the natural regeneration process.

Protect vegetation from unacceptable impacts due to pests, wildlife, livestock, or fire. Exclude livestock as needed to establish vegetative cover.

Control noxious weeds as required by state law.

Wetland Area - Design the wetland so that at least 70 percent of the wetland area will be restored to the natural wetland plant community that is typically found in the same physiographic region and similar landscape position. Where woody vegetation was originally present, a suitable precursor to the original community may be established that will, over time, allow a mature wetland plant community to develop.

Up to 30 percent of the wetland area may be restored and maintained as shallow open water and/or as a wetland plant community different from that which originally occurred on the site. The purpose of this modification shall be to support a diverse plant and animal community.

Vegetation shall be established by planting or by natural regeneration methods, or a combination of the two. Vegetation may include trees, shrubs, and/or herbaceous species, depending on site conditions, planned functions of the site, and the desires of the client.

Areas within the restored wetland that need short-term herbaceous cover to control erosion and to help build the organic components of the soil shall be stabilized with an appropriate seed mix for wetlands. Temporary or non-competitive permanent mixes may be needed in areas where natural regeneration is planned, woody species will be planted, or other permanent plantings will be delayed. Plantings for short-term cover shall be non-competitive to the introduction and establishment of the desired species.

Refer to Figure 1 and Tables 1 to 5 of this standard for recommended planting dates, and selected lists of herbaceous and woody species suitable for planting in wet sites.

Buffer Area - An upland buffer, consisting primarily of perennial vegetation, shall be established (or maintained, if already present) a minimum 35 feet wide around the wetland. Vegetation may include trees, shrubs, and/or herbaceous species.

For optimum wildlife habitat on most sites, seeding mixes and woody vegetation shall be specified for the buffer in accordance with the Maryland conservation practice standard for Conservation Cover, Code 327. When severe site conditions are present or anticipated, or significant erosion control is needed, the Maryland conservation practice standard for Critical Area Planting, Code 342, shall be used to specify the appropriate plantings.

For purposes of this standard, the buffer criteria do not apply to the portion of the site occupied by structural measures such as embankments or surface drain plugs.

Establishment Goal for Vegetation - Buffer areas and wetland areas that are planned to support vegetation shall meet the following minimum requirements for vegetative cover, based on the primary purpose of the practice:

Primary Purpose of the Wetland and Buffer	Establishment Goal (minimum cover requirements after five years)
Create or Enhance Wildlife Habitat	*Herbaceous vegetation areas:* Minimum 85% areal cover of desired species
	Woody vegetation areas: Minimum 200 trees and/or shrubs per acre (5 plants/1,000 SF) of desired species
Improve Water Quality	*Herbaceous vegetation areas:* Minimum 85% areal cover of desired species
	Woody vegetation areas: Minimum 300 trees and/or shrubs per acre (7 plants/1,000 SF) of desired species

Topsoiling - Spread stockpiled topsoil to a depth of 4 to 6 inches where needed to provide a suitable medium for plant growth. Do not redistribute topsoil that is known to contain invasive or noxious weeds.

Organic Matter Amendments for Inundated Areas - If an insufficient quantity of topsoil is available, organic matter such as straw, composted manure, or wood chips shall be added where needed on portions of the site that will be inundated with shallow water. Organic matter (organic carbon) is necessary to restore the natural functions of a wetland, including sustaining beneficial microbes and aquatic invertebrates.

If the soil surface horizon (the 'A' horizon) has a Munsell value and chroma $\leq$3, it will normally contain at least 1% organic matter, and does not need to be augmented. However, if the surface layer has a Munsell value or chroma >3, then use one of the following options to add organic matter to the wetland area:

1. Straw - Spread straw over the soil surface to a minimum thickness of 3 inches (1.5 to 2 tons per acre); or,

2. Composted Manure - Spread composted cow or horse manure to a minimum thickness of 4 inches (500 cubic yards per acre); or,

3. Wood Chips - Spread aged hardwood chips (not bark) to a minimum thickness of 4 inches (500 cubic yards per acre).

It is not necessary to incorporate the organic matter into the soil if the inundated areas are intended to remain as shallow open water, or if they will be allowed to revegetate naturally. If the inundated areas will be revegetated by planting, mix the organic matter into the top 4 to 6 inches of soil.

Additional Criteria for Structural Materials

Pipe Conduits - Pipe conduits shall conform to the requirements in the Maryland conservation practice standard for Pond, Code 378. Anti-seep collars are not required on embankments with a height of less than 4 feet.

Concrete - Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 902.10, Mix No. 3.

Rock Riprap - Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specification for Construction and Materials, Section 901.02.

Geotextile - Geotextile materials shall meet the requirements of Maryland Department of Transportation, State Highway Administration

Standard Specifications for Construction and Materials, Section 921.09.

SPECIFICATIONS

Plans and specifications for the restoration of a wetland shall be prepared for specific field sites, according to the Considerations, Criteria, and Operation and Maintenance described in this standard, and will normally be part of the overall conservation plan. Plans and specifications shall include construction plans, photographs, drawings, job sheets, construction specifications, narrative statements in the conservation plan, and other similar documents, as appropriate. Documentation shall be in accordance with the section "Supporting Data and Documentation" in this standard.

All components of the completed measures shall conform to the lines, dimensions, grades, and slopes shown on the plans or staked on the site. All materials shall be as specified on the construction drawings. The contractor shall be responsible for furnishing materials certification. These certification slips shall be retained with the "as-built" plans.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be prepared for each wetland restoration site. Appropriate Job Sheet(s) may be used to serve as the management plan as well as supporting documentation, and shall be provided to the client. At a minimum, the following components shall be addressed in the O&M plan, as applicable:

Structures

Describe what inspections are required to assess the integrity of the structure and determine whether it is functioning properly.

Removal of Sediment and Other Repairs

Describe locations where sediment removal is acceptable (e.g., designed sediment basins, open water areas); conditions under which sediment may be removed and repairs made (e.g., time of year restrictions, permits needed, etc.).

Vegetation in the Wetland Area

Describe what inspections are required to determine whether the desired vegetation is present in suitable quantity, quality, and distribution to meet objectives of the project. Describe the extent of management needed to maintain vegetation in the desired species composition or age class (if applicable), or no management required (e.g., natural area).

Vegetation on Structures and in Buffer Areas

Describe the extent of vegetative management that will be allowed/needed after the practice is established. Management may consist of mowing, burning, selective cutting, or other actions, as appropriate.

When optimum wildlife habitat is desired, vegetation on structures and in buffers shall not be mowed, burned, or otherwise disturbed during the nesting season of the desired wildlife species. For Maryland, the primary nesting season is generally from April 15 through August 15.

Nuisance Plants and Animals

Describe the extent to which plant and animal pest species, including noxious weeds, will need to be controlled.

Acceptable Uses

Describe the acceptable uses (e.g., timber production, grazing, hunting, nature preserve, etc.) and time of year/frequency of use restrictions, if any.

Frequency of Inspections

At a minimum, require annual inspections of structural and vegetative components.

SUPPORTING DATA AND DOCUMENTATION

Planning Information, Field Data, and Survey Notes

Record on survey note paper, SCS-ENG-28 & 29, and/or in the conservation plan folder, as appropriate. The following is a list of the minimum data and documentation to be recorded in the case file:

1. Field location of the project, acres, and assistance notes. Also note the location of the project on the conservation plan map. Assistance notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom;

2. Description of the objectives of the project, including the desired functions that the wetland is expected to provide;

3. Soil investigation logs and notes;

4. Inventory of existing vegetation on the site. If applicable and available, note the agrichemicals that have been used on the site during the past 5 years;

5. Topographic survey of the site, as appropriate for site conditions and the proposed design;

6. Description of existing drains and extent of existing blockage (if any).

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the Engineering Field Handbook, Part 650. The following is a list of the minimum required design data:

1. Hydrologic and hydraulic design computations;

2. Cross-section(s) of embankment for quantities determination;

3. Profile of vegetated spillway;

4. Detail of water control structure, including profile, elevations, and materials specifications with type and gauge/thickness of pipes;

5. Planned blockage of drainage systems, including cross sections and lengths of drain plugs;

6. Plan view(s) to scale with north arrow and stationing showing topographic contours, planting zones for vegetation, and locations of other features, as appropriate;

7. Seeding and/or planting requirements, including species selected for each planting zone, stocking/seeding rates, and the size and type of planting stock to be used (e.g., bare-root seedlings, containerized stock, etc.), shown on plans;

8. Quantities estimate;

9. Show job class on plans;

10. Operation and maintenance plan.

Construction Check Data/As-Built

Record on survey notepaper, SCS-ENG-28, or other appropriate engineering paper. Survey data shall be plotted on plans in red. The following is a list of minimum data needed for as-builts:

1. Documentation of site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom;

2. Check notes recorded during or after completion of construction, and plans showing as-built conditions of all structures;

3. Note plant species as-installed, including species used, quantities, date(s) planted, and arrangement of plants within each planting zone;

4. Final quantities, and documentation for quantity changes and materials certification;

5. Sign and date checknotes and plans by a person with appropriate approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.

REFERENCES

1. Maryland Department of Transportation, State Highway Administration, January 2001. *Standard Specifications for Construction and Materials*. Baltimore, Maryland.

2. USDA, Natural Resources Conservation Service. *Conservation Practice Standard for Conservation Cover, Code 327*. Maryland Field Office Technical Guide, Section IV.

3. USDA, Natural Resources Conservation Service. *Conservation Practice Standard for Constructed Wetland, Code 656*. National Handbook of Conservation Practices.

4. USDA, Natural Resources Conservation Service. *Conservation Practice Standard for Critical Area Planting, Code 342*. Maryland Field Office Technical Guide, Section IV.

5. USDA, Natural Resources Conservation Service. *Conservation Practice Standard for Pond, Code 378.* Maryland Field Office Technical Guide, Section IV.

6. USDA, Natural Resources Conservation Service. *Conservation Practice Standard for Wetland Creation, Code 658*. Maryland Field Office Technical Guide, Section IV.

7. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 14, "Drainage."*

8. USDA, Natural Resources Conservation Service. *Maryland Wildlife Biology and Management Handbook*.

9. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 11, "Ponds and Reservoirs".*

10. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 5, "Preparation of Engineering Plans."*

11. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 6, "Structures."*

12. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 650, Engineering Field Handbook, Chapter 13, "Wetland Restoration, Enhancement or Creation."*

13. U.S. Fish and Wildlife Service, Chesapeake Bay Field Office with the Natural Science Center and Adkins Arboretum, 1995. *Native Plants for Wildlife Habitat*. Annapolis, MD.

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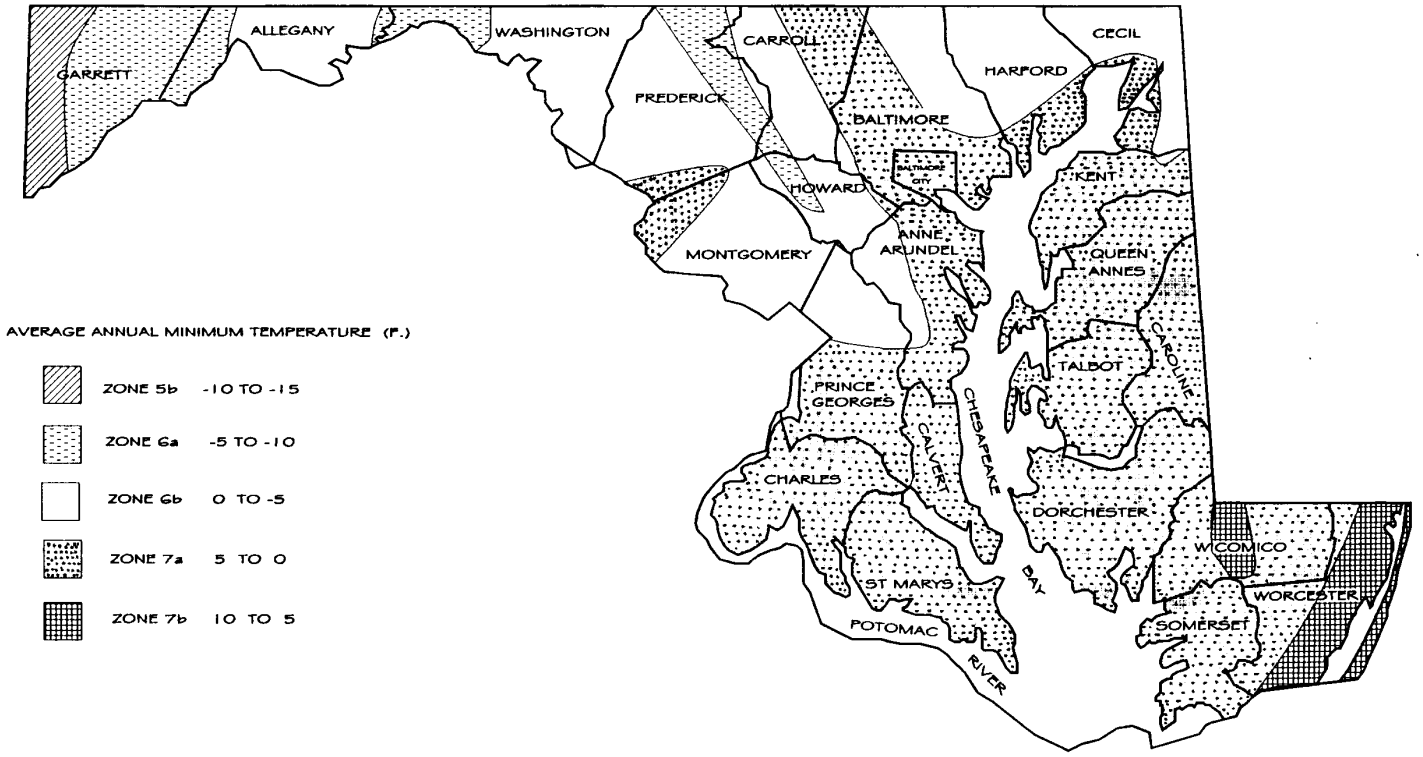
FIGURE 1: USDA Plant Hardiness Zones for Maryland



Plant Hardiness Zones delineate areas where a species can be successfully established based on average annual minimum temperatures.

TABLE 1: Recommended Planting Dates in Maryland [1/]

Type of Plant Material	Plant Hardiness Zones		
	5b and 6a	**6b**	**7a and 7b**
Seeds - Cool-Season Grasses (includes mixes with forbs and/or legumes)	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Oct 31 Nov 1 to Nov 30♦
Seeds - Warm-Season/Cool-Season Grass Mixes (includes mixes with forbs and/or legumes)	Mar 15 to May 31♦♦ Jun 1 to Jun 15*	Mar 1 to May 15♦♦ May 16 to Jun 15*	Feb 15 to Apr 30♦♦ May 1 to May 31*
Seeds - Warm-Season Grasses (includes mixes with forbs and/or legumes)	Mar 15 to Jun 15♦♦ Jun 15 to Jun 30* Nov 1 to Dec 1**	Mar 1 to Jun 15♦♦ Jun 15 to Jun 30* Nov 15 to Dec 15**	Feb 15 to May 31♦♦ Jun 1 to Jun 30* Dec 1 to Dec 31**
Unrooted Woody Materials; Bare-Root Plants; Bulbs, Rhizomes, Corms, and Tubers [2/]	Mar 15 to May 31 Jun 1 to Jun 30*	Mar 1 to May 15 May 16 to Jun 30*	Feb 15 to Apr 30 May 1 to Jun 30*
Containerized Stock; Balled-and-Burlapped Stock	Mar 15 to May 31 Jun 1 to Jun 30* Sep 1 to Nov 15*✦	Mar 1 to May 15 May 16 to Jun 30* Sep 15 to Nov 30*✦	Feb 15 to Apr 30 May 1 to Jun 30* Oct 1 to Dec 15*✦

TABLE 1 NOTES:

1. The planting dates listed are averages for each zone. These dates may require adjustment to reflect local conditions, especially near the boundaries of the zones.

2. When planted during the growing season, most of these materials must be purchased and kept in a dormant condition until planting. Bare-root grasses are the exception—they may be supplied as growing (non-dormant) plants.

♦ Additional planting dates for the lower Coastal Plain, dependent on annual rainfall and temperature trends.

♦♦ In general, planting during the latter portion of this period allows more time for weed emergence and weed control prior to planting. When selecting a planting date, consider the need for weed control vs. the likelihood of having sufficient moisture for later plantings, especially on droughty sites.

* Additional planting dates during which supplemental watering may be needed to ensure plant establishment.

** Fall dormant season plantings of warm-season grasses – starting approximately 2 weeks after the first hard freeze (average date based on air temperature reading of 28 degrees F or lower, 50% probability of occurrence). Warm-season grasses need a soil temperature of at least 50 degrees F in order to germinate. If soil temperatures are colder than 50 degrees, or moisture is not adequate, the seeds will remain dormant until conditions are favorable.

✦ Frequent freezing and thawing of wet soils may result in frost-heaving of materials planted in late fall, if plants have not sufficiently rooted in place. Large containerized and balled-and-burlapped stock may be planted into the winter months as long as the ground is not frozen and soil moisture is adequate.

TABLE 2: Selected List of Herbaceous Cover Mixes [1/]

Mix	Recommended Cultivar	Seeding Rate (lbs/ac) [2/]	Plant Hardiness Zones [3/]	Max. Height (feet)	Type of Grass in Mix	Remarks
1. Barnyard Grass *Echinochloa crus-galli*	Common	5 - 10	All	3 - 4	Warm & cool season grasses	Mix for temporary site stabilization. Introduced (non-native), short-lived grasses. Can be used when permanent plantings will be delayed. (For example, use this mix to stabilize the site in late fall, then plant permanent vegetation the following spring.) Suitable for seasonally saturated wetlands and adjacent somewhat poorly drained areas. Tolerates dry conditions and brief periods of inundation after establishment.
Redtop *Agrostis gigantea*	Streaker	1 - 2				
2. Creeping Bentgrass *Agrostis stolonifera*	Penncross, Southshore	4 - 6	All	1 - 2	Cool season grasses	Companion planting for trees and shrubs. Low-growing, native perennial grasses. Mix provides semi-permanent grass cover that helps to suppress weeds and control erosion. May be planted at the same time as woody plantings. Suitable for seasonally saturated wetlands and adjacent somewhat poorly drained areas. Tolerates dry conditions and brief periods of inundation after establishment.
Fowl Meadowgrass *Poa palustris*	Common	4 - 8				
3. Virginia Wild Rye *Elymus virginicus*	Common	2 - 3	All	2 - 3	Warm & cool season grasses	Early successional mix. Low-growing all-native species. Use this as a basic "starter mix" to provide cover in areas where natural regeneration is planned. Suitable for seasonally saturated wetlands and adjacent somewhat poorly drained areas. Tolerates dry conditions and brief periods of inundation after establishment. Fowl meadowgrass may be short-lived on the Coastal Plain, especially on drier sites in full sun.
Red Fescue *Festuca rubra*	Common	3 - 4				
Fowl Meadowgrass *Poa palustris* **OR**	Common	2 - 4				
Deertongue *Dichanthelium clandestinum*	Tioga	2 - 4				
AND ADD:						
Partridge Pea *Chamaecrista fasciculata*	Common	2 - 3				
4. Barnyard Grass *Echinochloa crus-galli*	Common	2 - 4	All	3 - 4	Warm & cool season grasses	Early successional mix. Mostly native species. The barn-yard grass is an introduced annual warm-season grass that provides temporary cover and wildlife food. All of the other species are native. Use this mix as a basic "starter mix" to provide cover in areas where natural regeneration is planned. Diverse mix that is suitable for seasonally saturated wetlands and adjacent somewhat poorly drained areas. Tolerates dry conditions and brief periods of inundation after establishment. Fowl meadowgrass may be short-lived on the Coastal Plain, especially on drier sites in full sun.
Fowl Meadowgrass *Poa palustris*	Common	2 - 4				
Virginia Wild Rye *Elymus virginicus*	Common	2 - 4				
AND ADD THE FOLLOWING WILDFLOWERS:						
Partridge Pea *Chamaecrista fasciculata*	Common	2 - 3				
Tickseed *Coreopsis tinctoria*	Common	0.13 - 0.25				
Smartweed *Polygonum pensylvanicum*	Common	0.50 - 1.00				
Swamp Milkweed *Asclepias incarnata*	Common	0.13 - 0.25				

TABLES 2 NOTES:

1. **Selected List of Herbaceous Cover Mixes:** This is a list of mixes that can be used for temporary site stabilization, companion plantings for trees and shrubs, and as basic "starter mixes" to provide initial cover and wildlife food where natural regeneration is planned. See the "Remarks" column of this table for recommended uses. Due to page limitations, this list is not all-inclusive. There are many other mixes that may be suitable, depending on site conditions and the purpose of the planting.

2. **Seeding Rate:** Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses, legumes, or wildflowers. All legume seeds shall be inoculated before planting with the appropriate *Rhizobium* bacteria. When feasible, hard-seeded legumes should be scarified to improve germination.

   When a seeding rate is expressed as a range (i.e., 4 - 6), the lower rate should be used if site conditions are generally good and erosion is not a concern.

3. The **Plant Hardiness Zones** designate where a species can be successfully planted in Maryland, while the **Geographic Distribution** describes where the species usually occurs under natural conditions.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation								
ASTER, NEW ENGLAND *Aster novae-angliae*	All	Statewide; common	FACW-	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies. Seeds eaten by songbirds.	Wet meadows. Prefers full sun. Attractive clusters of purple flowers.
ASTER, NEW YORK *Aster novi-belgii*	All	Mostly Coastal Plain; common	FACW+	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies. Seeds eaten by songbirds.	Wet meadows. Prefers full sun. Attractive clusters of violet flowers.
ASTER, PURPLE-STEMMED *Aster puniceus*	All	Statewide; common	OBL	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies. Seeds eaten by songbirds.	Wet meadows. Prefers full sun. Attractive clusters of violet flowers.
BENTGRASS, CREEPING *Agrostis stolonifera*	All	Statewide	FACW	❍	<3 ft.	Slow	Seeds eaten by songbirds.	Wet meadows. Cool-season grass with creeping habit.
BLUESTEM, BUSHY *Andropogon glomeratus*	6a, 6b, 7a, 7b	Coastal Plain	FACW+	❍	<3 ft.	Fast	Seeds eaten by songbirds.	Wet meadows. Warm-season grass with stiff stems.
BONESET *Eupatorium perfoliatum*	All	Statewide; common	FACW+	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Small white flower clusters.
CARDINAL FLOWER *Lobelia cardinalis*	All	Statewide; common	FACW+	◗	<3 ft.	Slow	Flowers attractive to hummingbirds & butterflies.	Wet meadows and open forested wetlands. Spike of attractive bright red flowers.
CORDGRASS, SALTMEADOW *Spartina patens*	All	Coastal Plain; common	FACW+	❍	<3 ft.	Fast	Seeds eaten by waterfowl & songbirds. Roots eaten by waterfowl and muskrats.	Tidal marshes above MHT. Warm-season grass. Salinity 0 – 35 ppt.
DEERTONGUE *Dichanthelium clandestinum*	All	Statewide; common	FAC+	❍ - ◗	<3 ft.	Slow	Seeds eaten by songbirds.	Wet meadows. Warm-season grass. Tolerates seasonal wetness and drought.
FESCUE, RED *Festuca rubra*	All	Statewide; common	FAC+	❍ - ●	<3 ft.	Slow	Seeds eaten by songbirds.	Shady uplands and moist sites. Cool-season, sod-forming grass. Very fine leaves. Tolerates drought once established.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation (continued)								
FERN, MARSH *Thelypteris thelypteroides*	All	Statewide; common	FACU	❍ - ◗	<3 ft.	Fast	Minimal value for food. Occasionally browsed by deer.	Open forested wetlands and wet meadows.
IRONWEED *Vernonia noveboracensis*	All	Statewide; common	FACW+	❍	3-6 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Deep purple flower clusters.
JOE-PYE WEED *Eupatorium fistulosum*	All	Statewide; common in W. Md.	FACW	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Pink-purple flower clusters.
JOE-PYE WEED, SPOTTED *Eupatorium maculatum*	5b, 6a, 6b	Piedmont & W. Md.; common	FACW	❍ - ◗	3-6 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Pink-purple flower clusters.
LOBELIA, BLUE *Lobelia siphilitica*	All	Statewide; common in Piedmont & W. Md.	FACW+	◗	<3 ft.	Slow	Flowers attractive to butterflies. Leaves and stems eaten by deer.	Wet meadows (often in shade) and saturated forested wetlands. Attractive blue flower spike.
MEADOWGRASS, FOWL *Poa palustris*	5b, 6a, 6b	Piedmont & W. Md.	FACW	❍ - ◗	<3 ft.	Slow	Seeds eaten by songbirds.	Wet meadows. Cool-season grass.
MILKWEED, SWAMP *Asclepias incarnata*	All	Statewide; common	OBL	❍	3-6 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Small pink flowers in clusters.
MONKEY FLOWER, WINGED *Mimulus alatus*	All	Statewide; less common on Coastal Plain	OBL	❍	<3 ft.	Slow	Flowers attractive to butterflies.	Wet meadows. Pink-purple flowers similar to snapdragons.
MONKEY FLOWER, ALLEGHANY *Mimulus ringens*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Slow	Flowers attractive to butterflies.	Openings in saturated forested wetlands. Pink-purple flowers similar to snapdragons.
PEA, PARTRIDGE *Chamaecrista fasciculata*	All	Statewide	FACU	❍ - ◗	<3 ft.	Fast	Seeds eaten by quail, turkeys, songbirds.	Mostly in upland fields. Tolerates moist sites. Reseeding annual legume. Feathery foliage; yellow flowers.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation (continued)								
REEDGRASS, WOOD *Cinna arundinacea*	All	Statewide; common	FACW+	❍ - ◗	3-6 ft.	Slow	Seeds eaten by songbirds. Foliage eaten by deer.	Saturated forested wetlands. Cool-season grass.
TICKSEED *Coreopsis tinctoria*	All	Statewide	FAC-	❍ - ◗	<3 ft.	Fast	Seeds eaten by songbirds.	River banks and floodplains. Prefers moist soils; tolerates dry sites. Reseeding annual with yellow flowers.
VERVAIN, BLUE *Verbena hastata*	All	Statewide; common	FACW+	❍	3-6 ft.	Slow	Seeds eaten by songbirds.	Wet meadows. Small blue flowers in spikes.
WILD RYE, VIRGINIA *Elymus virginicus*	All	Statewide	FACW-	❍ - ◗	<3 ft.	Fast	Foliage eaten by wildlife in early spring.	Wet meadows and river banks. Cool-season grass.
Water Regime: Surface Saturation to +3 inches of Surface Water								
CUTGRASS, RICE *Leersia oryzoides*	All	Statewide; common	OBL	❍	<3 ft.	Fast	Seeds eaten by waterfowl, songbirds. Roots eaten by waterfowl.	Shallow fresh marshes & wet meadows. Cool-season grass. Leaves have sawtoothed edges.
FERN, SENSITIVE *Onoclea sensibilis*	All	Statewide; common	FACW	❍ - ●	<3 ft.	Fast	Minimal value for food. Occasionally browsed by deer.	Wet meadows and saturated forested wetlands.
FERN, CINNAMON *Osmunda cinnamomea*	All	Statewide; common	FACW	●	3-6 ft.	Slow	Minimal value for food. Occasionally browsed by deer.	Saturated forested wetlands.
FERN, ROYAL *Osmunda regalis*	All	Statewide; common	OBL	◗ - ●	3-6 ft.	Slow	Minimal value for food. Occasionally browsed by deer.	Wooded swamps and saturated forested wetlands.
IRIS, BLUE *Iris versicolor*	All	Statewide; common	OBL	❍	<3 ft.	Slow	Plants eaten by muskrats.	Shallow fresh marshes. Attractive blue flower.
IRIS, VIRGINIA *Iris virginica*	All	Mostly Coastal Plain; uncommon	OBL	❍	<3 ft.	Slow	Plants eaten by muskrats.	Shallow fresh marshes. Attractive blue flower.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to +3 inches of Surface Water (continued)								
MALLOW, MARSH *Kosteletzkya virginica*	7a, 7b	Coastal Plain	OBL	❍	3-6 ft.	Slow	Flowers attractive to hummingbirds.	Brackish & fresh tidal marshes; saturated soils above MHT. Salinity 0 - 10 ppt. Large, showy pink flowers.
MALLOW, ROSE *Hibiscus moscheutos*	All	Coastal Plain	OBL	❍	3-6 ft.	Slow	Flowers attractive to hummingbirds.	Brackish & fresh tidal marshes; saturated soils above MHT. Salinity 0 - 15 ppt. Large, showy white flowers.
MANNA GRASS *Glyceria canadensis*	5b, 6a, 6b	Piedmont & W. Md.	OBL	❍ - ◗	3-6 ft.	Fast	Seeds eaten by songbirds, waterfowl. Plants eaten by deer, muskrats.	Shallow fresh marshes, wet meadows, open forested wetlands. Cool-season grass.
MANNA GRASS, EASTERN *Glyceria septentrionalis*	All	Mostly Coastal Plain; common	OBL	❍	3-6 ft.	Fast	Seeds eaten by songbirds, waterfowl. Plants eaten by deer, muskrats.	Shallow fresh marshes and wet meadows. Cool-season grass.
MANNA GRASS, FOWL *Glyceria striata*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Slow	Seeds eaten by songbirds, waterfowl. Plants eaten by deer, muskrats.	Wet meadows. Cool-season grass. Contains prussic acid; can be poisonous to livestock.
MILLET, WALTER'S *Echinochloa walteri*	All	Mostly Coastal Plain; common	FACW+	❍	<3 ft.	Slow	Seeds eaten by songbirds, waterfowl.	Shallow fresh marshes and wet meadows. Annual, warm-season grass.
REEDGRASS, BLUE-JOINT *Calamagrostis canadensis*	5b, 6a, 6b	Mostly Piedmont & W. Md.	FACW+	❍ - ◗	3-6 ft.	Slow	Stems, leaves, & rootstocks eaten by muskrats, deer.	Shallow fresh marshes, wet meadows, open forested wetlands. Cool-season grass.
RUSH, SOFT *Juncus effusus*	All	Statewide; common	FACW+	❍	<3 ft.	Slow	Seeds eaten by songbirds, waterfowl.	Shallow fresh marshes and wet meadows.
SMARTWEED, PENNSYLVANIA *Polygonum pensylvanicum*	All	Statewide; common	FACW	❍	3-6 ft.	Fast	Seeds eaten by waterfowl, songbirds.	Shallow marshes and wet meadows. Small pink flowers.
SMARTWEED, SWAMP *Polygonum hydropiperoides*	All	Statewide; common	OBL	❍	<3 ft.	Fast	Seeds eaten by waterfowl, songbirds.	Shallow fresh marshes and wet meadows. Small white flowers.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to +3 inches of Surface Water (continued)								
SWITCHGRASS *Panicum virgatum*	All	Mostly Coastal Plain; common	FAC	❍	3-6 ft.	Slow	Seeds eaten by songbirds. Foliage eaten by rabbits, deer.	Wet meadows; shallow edges of fresh & brackish marshes. Warm-season grass. Salinity 0 - 10 ppt.
TEARTHUMB *Polygonum arifolium* *Polygonum sagittatum*	All	Statewide; common	OBL	❍	Vine	Fast	Seeds eaten by waterfowl, songbirds.	Shallow fresh marshes and wet meadows. Small white-pink flowers. Many small prickles on stems.
WOOL-GRASS *Scirpus cyperinus*	All	Statewide; common	FACW+	❍	3-6 ft.	Fast	Seeds eaten by songbirds, waterfowl. Rootstocks & foliage eaten by muskrats.	Shallow fresh marshes and wet meadows. A bulrush, not a grass.
WILD RICE *Zizania aquatica*	All	Mostly Coastal Plain	OBL	❍	6-9 ft.	Slow	Seeds eaten by songbirds, waterfowl.	Mostly in tidal fresh marshes. Annual, cool-season grass.
Water Regime: Surface Saturation to +6 inches of Surface Water								
ARROW-ARUM *Peltandra virginica*	All	Mostly Coastal Plain; common	OBL	❍ - ◗	<3 ft.	Slow	Seeds eaten by waterfowl, rails, muskrats.	Shallow marshes and stream edges. Salinity 0 - 2 ppt. Plant also known as "Duck Corn." Inconspicuous green flowers.
BURREED, AMERICAN *Sparganium americanum*	All	Mostly Coastal Plain & Piedmont	OBL	❍ - ◗	<3 ft.	Fast	Seeds eaten by waterfowl and rails. Stems and leaves eaten by muskrats.	Shallow fresh marshes, especially along rivers & streams. White flowers.
BURREED, GIANT *Sparganium eurycarpum*	All	Statewide; common	OBL	❍	3-6 ft.	Fast	Seeds eaten by waterfowl and rails. Stems and leaves eaten by muskrats.	Shallow fresh marshes. White flowers.
BULRUSH, GREEN *Scirpus atrovirens*	All	Statewide; common	OBL	❍	3-6 ft.	Fast	Seeds eaten by waterfowl, songbirds. Rootstocks & stems eaten by muskrats.	Shallow fresh marshes and wet meadows.
BULRUSH, RIVER *Bolboschoenus fluviatilis* (formerly *Scirpus fluviatilis)*	All	Coastal Plain; common	OBL	❍ - ◗	3-6 ft.	Fast	Seeds eaten by waterfowl, songbirds. Rootstocks & stems eaten by muskrats.	Shallow fresh marshes.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to +6 inches of Surface Water (continued)								
BULRUSH, SOFT-STEM *Schoenoplectus tabernaemontani* (formerly *Scirpus validus)*	All	Statewide; common	OBL	❍	6-9 ft.	Fast	Seeds eaten by waterfowl, songbirds. Rootstocks & stems eaten by muskrats.	Shallow fresh to slightly brackish marshes. Salinity 0 - 5 ppt.
BULRUSH, THREE-SQUARE *Schoenoplectus pungens* (formerly *Scirpus pungens)*	All	Statewide; common	FACW+	❍	<3 ft.	Fast	Seeds eaten by waterfowl, songbirds. Rootstocks & stems eaten by muskrats.	Shallow fresh to brackish marshes and open water fringes. Salinity 0 - 15 ppt.
CORDGRASS, SALTMARSH *Spartina alterniflora*	All	Coastal Plain	OBL	❍	3-6 ft.	Fast	Seeds eaten by waterfowl & songbirds. Roots eaten by waterfowl and muskrats.	Tidal marshes between midtide and MHT. Warm-season grass. Salinity 0 - 35 ppt.
SEDGE, FOX *Carex vulpinoidea*	All	Statewide; common	OBL	❍	<3 ft.	Slow	Seeds eaten by waterfowl, songbirds, rails. Foliage eaten by deer.	Shallow fresh marshes.
SEDGE, FRINGED *Carex crinita*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Slow	Seeds eaten by waterfowl, songbirds, rails. Foliage eaten by deer.	Forested wetlands and thickets.
SEDGE, SHALLOW *Carex lurida*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Slow	Seeds eaten by waterfowl, songbirds, rails. Foliage eaten by deer.	Forested wetlands with shallow water and/or saturated soil.
SEDGE, THREE-WAY *Dulichium arundinaceum*	All	Statewide; common	OBL	❍	<3 ft.	Slow	Foliage eaten by deer.	Shallow fresh marshes and openings in forested wetlands.
SEDGE, TUSSOCK *Carex stricta*	All	Statewide; common	OBL	❍	<3 ft.	Slow	Seeds eaten by waterfowl, songbirds, rails. Foliage eaten by deer.	Shallow fresh marshes and wet meadows.
SPIKERUSH, BLUNT *Eleocharis obtusa*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Slow	Seeds and plants eaten by waterfowl, muskrats.	Shallow fresh marshes and open water fringes.
SWEETFLAG *Acorus americanus* (formerly *Acorus calamus)*	All	Statewide; more common on Coastal Plain	OBL	❍ - ◗	<3 ft.	Fast	Roots eaten by waterfowl, muskrats.	Shallow fresh to brackish marshes, stream edges, and wet meadows on floodplains. Salinity 0 - 10 ppt. Inconspicuous green flowers.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to +12 inches of Surface Water								
ARROWHEAD, BROADLEAF *Sagittaria latifolia*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Fast	Seeds and tubers eaten by waterfowl, wading birds, muskrats.	Shallow fresh marshes. White flowers.
ARROWHEAD, RIGID *Sagittaria rigida*	All	Mostly Coastal Plain & Piedmont.	OBL	❍ - ◗	<3 ft.	Fast	Seeds and tubers eaten by waterfowl, wading birds, muskrats.	Shallow fresh marshes. White flowers.
CATTAIL, NARROW-LEAF *Typha angustifolia*	All	Mostly Coastal Plain; common	OBL	❍	3-6 ft.	Fast	Rootstocks eaten by geese and muskrats. Stems also eaten by muskrats.	Shallow fresh and brackish marshes. Salinity 0 - 15 ppt. **Aggressive species.** Tends to dominate wetlands, to the exclusion of other plants. Should not be planted if a mix of plant species is desired.
CATTAIL, BROAD-LEAF *Typha latifolia*	All	Statewide; common	OBL	❍	3-6 ft.	Fast	Rootstocks eaten by geese and muskrats. Stems also eaten by muskrats.	Shallow fresh marshes. **Aggressive species.** Tends to dominate wetlands, to the exclusion of other plants. Should not be planted if a mix of plant species is desired.
CLUB, GOLDEN *Orontium aquaticum*	6a, 6b, 7a, 7b	Mostly Coastal Plain; uncommon elsewhere	OBL	❍	<3 ft.	Fast	Seeds eaten by waterfowl, muskrats.	Tidal fresh marshes, shallow ponds, slow streams. Small yellow flowers on a spathe.
LIZARD'S-TAIL *Saururus cernuus*	All	Statewide; more common on Coastal Plain	OBL	❍ - ◗	<3 ft.	Fast	Occasionally eaten by wood ducks.	Shallow fresh marshes and openings in forested wetlands. Nodding spike of small white flowers.
PICKEREL-WEED *Pontederia cordata*	All	Statewide; more common on Coastal Plain	OBL	❍ - ◗	<3 ft.	Fast	Seeds and roots eaten by waterfowl. Flowers attractive to butterflies.	Shallow fresh to slightly brackish marshes and slow streams. Salinity 0-3 ppt. Showy, small blue flowers on spikes up to 6" long.

TABLE 3: Selected List of Native Herbaceous Plants [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at Maturity	Rate of Spread [4/]	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to +12 inches of Surface Water (continued)								
POND-LILY, YELLOW (SPATTERDOCK) *Nuphar lutea*	All	Statewide; common	OBL	❍ - ◗	<3 ft.	Fast	Seeds eaten by waterfowl, muskrats. Stems also eaten by muskrats.	Tidal fresh marshes, shallow ponds, slow streams. Tolerates tidal inundation up to 3 feet. Large, heart-shaped leaves. Bright yellow flowers.
Water Regime: +12 inches to +36 inches of Surface Water, and Deeper								
LOTUS, AMERICAN *Nelumbo lutea*	All	Statewide; uncommon	OBL	❍	3-6 ft.	Fast	Seeds eaten by waterfowl, muskrats. Stems also eaten by muskrats.	Shallow ponds, slow streams. Large, round leaves, floating or raised above the water. Can grow in water up to 6 feet deep. Pale yellow flowers on stalks extending up to 3 feet above the water.
WATER-LILY, WHITE *Nymphaea odorata*	All	Statewide; common	OBL	❍ - ◗	3-6 ft.	Fast	Seeds eaten by waterfowl, muskrats. Stems also eaten by muskrats.	Tidal fresh marshes, shallow ponds and bogs. Can grow in water up to 4 feet deep. Leaves and flowers float on the water surface. Attractive white flowers.

Notes for this table are located on Page 31.

TABLE 4: Selected List of Native Trees [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 Years	Wildlife Value for Food	Natural Habitat and Other Characteristics
DECIDUOUS TREES **Water Regime: Surface Saturation to Infrequent Inundation**							
ASH, GREEN *Fraxinus pennsylvanica*	All	Statewide	FACW	❍ - ◗	35 ft.	Seeds eaten by ducks, gamebirds, songbirds, squirrels. Plants browsed by deer.	Streambanks, floodplains, and bottomland swamps. Important lumber tree.
BIRCH, RIVER *Betula nigra*	All	Mostly Coastal Plain; Piedmont, Ridge & Valley at lower elevations	FACW	❍ - ◗	30 ft.	Seeds eaten by ducks and songbirds.	Streambanks and floodplains. Prefers full sun. Sometimes planted as an ornamental.
BOX-ELDER *Acer negundo*	All	Statewide; less common on Coastal Plain & at higher elevations of W. Md.	FAC+	❍	40 ft.	Seeds eaten by gamebirds, songbirds, squirrels. Browsed by deer.	Streambanks and floodplains. Tolerates drought. Grows rapidly.
COTTONWOOD, EASTERN *Populus deltoides*	All	Statewide; esp. common in Potomac River watershed	FAC	❍ - ◗	60 ft.	Browsed by deer and rabbits. Buds and catkins eaten by squirrels and quail.	Streambanks and floodplains. Tolerates drought. Grows rapidly.
CYPRESS, BALD *Taxodium distichum*	6a, 6b, 7a, 7b	Lower Eastern Shore (esp. Pocomoke River); also in Calvert Co.	OBL	❍ - ◗	30 ft.	Seeds eaten by ducks and marsh birds.	Streambanks and bottomland swamps. Tolerates drought and prolonged inundation.
GUM, BLACK *Nyssa sylvatica*	All	Statewide	FAC	❍ - ◗	30 ft.	Fruits eaten by squirrels, quail, turkey, and songbirds. Browsed by deer.	Streambanks, floodplains, and other wet areas. Tolerates drought. Foliage turns bright red in early fall.

TABLE 4: Selected List of Native Trees [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 Years	Wildlife Value for Food	Natural Habitat and Other Characteristics
DECIDUOUS TREES **Water Regime: Surface Saturation to Infrequent Inundation (continued)**							
GUM, SWEET *Liquidambar styraciflua*	6b, 7a, 7b	Mostly Coastal Plain; infrequent elsewhere	FAC	❍ - ◗	40 ft.	Seeds eaten by songbirds, squirrels, and chipmunks.	Streambanks, floodplains, and other wet areas. Tolerates drought.
MAGNOLIA, SWEETBAY *Magnolia virginina*	6b, 7a, 7b	Coastal Plain	FACW+	❍ - ●	15 ft.	Seeds eaten by songbirds, squirrels. Browsed by deer.	Streambanks, floodplains, and other wet areas. Considered a small tree or shrub. May be evergreen in mild winters. Creamy white flowers up to 3" diameter.
MAPLE, RED *Acer rubrum*	All	Statewide	FAC	❍ - ◗	35 ft.	Seeds eaten by ducks, gamebirds, songbirds, squirrels. Browsed by deer.	Streambanks, floodplains, and other wet areas. Tolerates drought.
MAPLE, SILVER *Acer saccharinum*	All	Statewide; less common on Coastal Plain & at higher elevations of W. Md.	FACW	❍ - ◗	40 ft.	Seeds eaten by ducks, gamebirds, songbirds, squirrels. Browsed by deer.	Streambanks and floodplains. Tolerates drought. Good source of woody debris for riparian systems.
NANNYBERRY *Viburnum lentago*	5b, 6a, 6b	Mostly Western Maryland	FAC	❍ - ◗	20 ft.	Berries eaten by turkey, grouse, songbirds, squirrels. Plants browsed by rabbits, deer.	Streambanks, floodplains, and other wet areas. Considered a small tree or shrub. Often suckers. Creamy white flowers. Berries are blue-black.
OAK, OVERCUP *Quercus lyrata*	6a, 6b, 7a, 7b	Mostly Patuxent River valley & Charles Co.; uncommon	OBL	❍ - ◗	25 ft.	Acorns eaten by wood ducks, quail, turkey, grouse, squirrels, and deer.	Streambanks and bottomland swamps. Tolerates frequent and prolonged inundation.

TABLE 4: Selected List of Native Trees [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 Years	Wildlife Value for Food	Natural Habitat and Other Characteristics
DECIDUOUS TREES **Water Regime: Surface Saturation to Infrequent Inundation (continued)**							
OAK, PIN *Quercus palustris*	All	Statewide, except in Garrett Co.	FACW	❍	35 ft.	Acorns eaten by wood ducks, quail, turkey, grouse, squirrels, and deer.	Floodplains and other wet areas. Tolerates drought. Widely planted as an ornamental. Produces small acorns.
OAK, SOUTHERN RED *Quercus falcata*	7a, 7b	Mostly Coastal Plain; infrequent elsewhere	FACU-	❍	35 ft.	Acorns eaten by wood ducks, quail, turkey, grouse, squirrels, and deer.	Floodplains and other wet areas. Tolerates drought.
OAK, SWAMP WHITE *Quercus bicolor*	All	Mostly Coastal Plain; infrequent elsewhere	FACW+	❍ - ◗	30 ft.	Acorns eaten by wood ducks, quail, turkey, grouse, squirrels, and deer.	Floodplains and other wet areas. Important lumber tree. Requires acid soils.
OAK, WILLOW *Quercus phellos*	6b, 7a, 7b	Mostly Coastal Plain; infrequent elsewhere	FAC+	❍ - ◗	30 ft.	Acorns eaten by wood ducks, quail, turkey, grouse, squirrels, and deer.	Floodplains and other wet areas. Frequently used as an ornamental planting. Produces small acorns.
PAWPAW *Asimina triloba*	6a, 6b, 7a, 7b	Statewide; infrequent	FACU+	❍ - ◗	20 ft.	Fruits eaten by fox, raccoon, and opossum.	Streambanks, floodplains, and other wet areas. Considered a small tree or shrub. Suckers and forms colonies. Dark purple flowers; large yellow fruits.
SYCAMORE *Platanus occidentalis*	All	Statewide; infrequent at higher elevations of W. Md.	FACW-	❍ - ◗	40 ft.	Seeds eaten by songbirds and squirrels.	Streambanks and floodplains. Unique peeling bark, fast growth rate. Good den tree.
WILLOW, BLACK *Salix nigra*	All	Statewide	FACW+	❍	60 ft.	Browsed by grouse, beaver, and deer.	Streambanks and floodplains. Fast growth rate. Can be invasive.

TABLE 4: Selected List of Native Trees [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 Years	Wildlife Value for Food	Natural Habitat and Other Characteristics
EVERGREEN TREES **Water Regime: Surface Saturation to Infrequent Inundation**							
CEDAR, ATLANTIC WHITE *Chamaecyparis thyoides*	All	Lower Eastern Shore; uncommon	OBL	❍ - ◗	25 ft.	Seeds eaten by songbirds. Browsed by deer.	Streambanks, bottomland swamps, and other wet areas. Tolerates frequent and prolonged inundation, but prefers a fluctuating water table. Cannot compete with hardwoods; best planted in solid stands.
HEMLOCK, EASTERN *Tsuga canadensis*	All	Mostly Western Maryland	FACU	❍ - ●	20 ft.	Seeds eaten by songbirds and squirrels. Browsed by deer.	Streambanks and floodplains. Often in part shade. Can become infested with hemlock woolly adelgid, a serious insect pest.
HOLLY, AMERICAN *Ilex opaca*	6a, 6b, 7a, 7b	Mostly Coastal Plain	FACU+	❍ - ●	20 ft.	Fruits eaten by songbirds, quail, and squirrels.	Streambanks, bottomland swamps, and other wet areas. Need male and female plants for fruit production.
PINE, LOBLOLLY *Pinus taeda*	6b, 7a, 7b	Mostly Coastal Plain	FAC-	❍	45 ft.	Seeds eaten by songbirds, quail, turkey. Browsed by deer and rabbits.	Streambanks, floodplains, and other wet areas. Important lumber tree on the Coastal Plain. Grows rapidly.

Notes for this table are located on Page 31.

TABLE 5: Selected List of Native Shrubs [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 years	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation							
ALDER, SMOOTH *Alnus serrulata*	All	Statewide; less common on Coastal Plain	OBL	❍ - ◗	10 ft.	Seeds eaten by ducks, quail, doves. Plants browsed by deer, beaver.	Shrub swamps and streambanks. Nitrogen-fixing. Attractive catkins. Provides good cover for woodcock.
ALDER, SPECKLED *Alnus incana* ssp. *rugosa* (formerly *A. rugosa)*	5b, 6a, 6b	Only in W. Md.; uncommon	FACW+	❍ - ◗	15 ft.	Seeds eaten by ducks, quail, doves. Plants browsed by deer, beaver.	Shrub swamps and streambanks. Nitrogen-fixing. Attractive catkins. Provides good cover for woodcock.
ARROWWOOD *Viburnum dentatum*	All	Statewide	FAC	❍ - ◗	10 ft.	Berries eaten by turkey, grouse, songbirds, squirrels. Plants browsed by rabbits, deer.	Shrub swamps and forested wetlands. Suckers freely; wood used to make arrows. White flowers, bluish-black berries.
AZALEA, SWAMP *Rhododendron viscosum*	All	Statewide	OBL	❍ - ◗	10 ft.	Flowers attractive to hummingbirds and butterflies. Plants browsed by deer.	Shrub swamps, forested wetlands, and streambanks. Showy pink-white tubular flowers.
BAYBERRY, NORTHERN *Morella pensylvanica* (formerly *Myrica pensylvanica*)	6b, 7a, 7b	Coastal Plain	FAC	❍ - ◗	10 ft.	Berries eaten by quail, songbirds. Plants browsed by deer.	Edges of tidal marshes and streams. Salinity 0-20 ppt. Need male and female plants for fruit production. Suckers to form colonies. Wax of berries used in candles.
BLUEBERRY, HIGHBUSH *Vaccinium corymbosum*	All	Coastal Plain	FACW-	❍ - ◗	10 ft.	Berries eaten by songbirds, turkey, squirrel. Plants browsed by deer, rabbits.	Forested wetlands. Prefers acid soils. Slow growing.

TABLE 5: Selected List of Native Shrubs [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 years	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation (continued)							
BUSH, HIGH TIDE (GROUNDSEL) *Baccharis halimifolia*	All	Coastal Plain	FACW	❍	10 ft.	Minimal value for food. Occasionally browsed by deer.	Brackish and coastal marshes, usually above MHW. Salinity 0-15 ppt. Has fluffy white seeds. Male flowers & female flowers on separate plants.
BUSH, HIGH TIDE (MARSH-ELDER) *Iva frutescens*	All	Coastal Plain	FACW+	❍	10 ft.	Minimal value for food. Occasionally browsed by deer.	Brackish and coastal marshes, usually above MHW. Salinity 0-15 ppt.
BUTTONBUSH *Cephalanthus occidentalis*	All	Statewide	OBL	❍ - ◗	8 ft.	Flowers attractive to hummingbirds. Seeds eaten by ducks and rails. Plants browsed by deer.	Shrub swamps and streambanks. Unusual, round white flowers. Tolerates long periods of inundation.
CHOKEBERRY, BLACK *Aronia melanocarpa*	5b, 6a, 6b	Piedmont & W. Md.	FAC	❍ - ◗	8 ft.	Fruits eaten by songbirds, grouse, bear, squirrel. Plants browsed by deer, rabbits.	Shrub swamps and forested wetlands. Fruits may remain on shrubs for much of the winter. Tends to sucker.
CHOKEBERRY, RED *Aronia arbutifolia*	All	Statewide	FACW	❍ - ◗	10 ft.	Fruits eaten by songbirds, grouse, bear, squirrel. Plants browsed by deer, rabbits.	Shrub swamps and forested wetlands. Fruits may remain on shrubs for much of the winter. Tends to sucker.
DOGWOOD, REDOSIER *Cornus sericea*	All	Statewide; uncommon	FACW+	❍ - ◗	8 ft.	Berries eaten by songbirds, grouse, turkey, quail, squirrels. Plants browsed by deer, rabbits.	Forested wetlands and streambanks. Attractive red stem color. White flowers and fruit.
DOGWOOD, SILKY *Cornus amomum*	All	Common on Coastal Plain & Piedmont	FACW	❍ - ◗	10 ft.	Berries eaten by songbirds, grouse, turkey, quail, squirrels. Plants browsed by deer, rabbits.	Forested wetlands and streambanks. Produces fruit at 3-5 years of age. White flowers with blue berries. Prefers some shade.

TABLE 5: Selected List of Native Shrubs [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 years	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation (continued)							
ELDERBERRY *Sambucus nigra* ssp. *canadensis* (formerly *S. canadensis)*	All	Statewide	FACW-	❍ - ◗	12 ft.	Berries eaten by songbirds, turkey, squirrels. Plants browsed by deer, rabbits.	Shrub swamps and streambanks. Large clusters of white flowers followed by purple berries; fast growth rate. Suckers freely.
FETTERBUSH *Leucothoe racemosa*	6a, 6b, 7a, 7b	Mostly Coastal Plain; common	FACW	❍ - ◗	12 ft.	Seeds eaten by songbirds. Plants browsed by deer.	Shrub swamps, streambanks, and forested wetlands. Small white flowers in drooping racemes.
INKBERRY *Ilex glabra*	6a, 6b, 7a, 7b	Coastal Plain	FACW-	❍ - ◗	10 ft.	Berries eaten by songbirds, quail, and squirrels.	Shrub swamps, streambanks, forested wetlands. Black fruits persist during the winter. Extensive rhizomes, often forms colonies.
PEPPERBUSH, SWEET *Clethra alnifolia*	All	Coastal Plain	FAC+	❍ - ◗	8 ft.	Flowers attractive to butterflies, other insects.	Shrub swamps and forested wetlands. Showy, fragrant white flower spikes in mid-summer, often when other flowers are less abundant.
POSSUM-HAW *Viburnum nudum*	All	Mostly Coastal Plain	OBL	❍ - ◗	12 ft.	Berries eaten by turkey, grouse, songbirds, squirrels. Plants browsed by rabbits, deer.	Shrub swamps and forested wetlands. White flower clusters, blue berries. Fruits may remain for much of the winter.
RAISIN, WILD *Viburnum cassinoides*	All	Mostly Western Maryland	FACW	❍ - ◗	8 ft.	Berries eaten by turkey, grouse, songbirds, squirrels. Plants browsed by rabbits, deer.	Shrub swamps and forested wetlands. White flower clusters, black berries. Fruits may remain on shrubs for much of the winter.
ROSE, SWAMP *Rosa palustris*	All	Statewide; more common on Coastal Plain	OBL	❍	6 ft.	Fruits eaten by songbirds. Plants browsed by deer.	Shrub swamps. Pink flowers, red fruits. Fruits may remain for much of the winter.

TABLE 5: Selected List of Native Shrubs [1/]

Plant Names	Plant Hardiness Zones [2/]	Geographic Distribution in Maryland [2/]	Wetland Indicator Status [3/]	Sun/ Shade [4/]	Height at 20 years	Wildlife Value for Food	Natural Habitat and Other Characteristics
Water Regime: Surface Saturation to Infrequent Inundation (continued)							
SPICEBUSH *Lindera benzoin*	All	Statewide	FACW-	❍ - ●	12 ft.	Berries eaten by songbirds.	Forested wetlands. Prefers some shade. Fragrant leaves and twigs; yellow fall color. Bright red berries.
SWEETSPIRE, VIRGINIA *Itea virginica*	6a, 6b, 7a, 7b	Coastal Plain	OBL	❍ - ●	8 ft.	Flowers attractive to butterflies.	Shrub swamps and forested wetlands. Small white flowers in elongated clusters up to 6 inches long.
WAXMYRTLE, SOUTHERN *Myrica cerifera*	7a, 7b	Coastal Plain	FAC	❍ - ◗	10 ft.	Berries eaten by quail, songbirds. Plants browsed by deer.	Edges of tidal marshes and streams. Salinity 0-10 ppt. Need male and female plants for fruit production. Wax of berries used in candles.
WITCH-HAZEL *Hamamelis virginiana*	All	Statewide; less common on Coastal Plain	FAC-	❍ - ◗	15 ft.	Seeds eaten by grouse and squirrels. Plants browsed by deer.	Forested wetlands, often near streams. Bark is used for making witch-hazel lotion. Fragrant yellow flowers.
WINTERBERRY *Ilex verticillata*	All	Statewide; less common on Coastal Plain	FACW+	❍ - ◗	10 ft.	Fruits eaten by songbirds, quail, and squirrels.	Shrub swamps and forested wetlands. Need male and female plants for fruit production. Bright red berries persist after leaves drop.

Notes for this table are located on Page 31.

TABLES 3 – 5 NOTES:

1. **Selected Lists of Native Herbaceous Plants, Trees, and Shrubs:** The term "native" refers to species that occur naturally in one or more geographic regions of Maryland. Due to page limitations, this listing of native species is not all-inclusive. There are many more native plants that occur in Maryland and may be suitable for planting in and around wetlands.

2. The **Plant Hardiness Zones** designate where a species can be successfully planted in Maryland, while the **Geographic Distribution** describes where the species usually occurs under natural conditions.

3. **Wetland Indicator Status:**

   OBL (obligate): Species occurs in wetlands >99 percent of the time. Usually requires semipermanent to permanent saturation of the soil surface or inundation with water.

   FACW (facultative wet): Species occurs in wetlands 67 - 99 percent of the time. Usually prefers seasonal to semi-permanent saturation/ inundation, but may tolerate periods of dryness late in the growing season.

   FAC (facultative): Species occurs in wetlands 34 - 66 percent of the time. Tolerant of a wide range of hydrologic conditions, ranging from semi-permanent saturation/inundation to extended periods of dryness.

   FACU (facultative upland): Species occurs in wetlands 1 - 33 percent of the time. Tolerant of a wide range of hydrologic conditions, ranging from seasonal saturation/inundation to extended periods of dryness.

   The (+) and (-) modifiers for OBL, FACW, FAC, and FACU means that the plant tends toward the upper or lower end of the range.

   Except as noted in the tables, most woody plants do not tolerate extended periods of inundation (surface water) during the growing season. Occasional inundation during the growing season is tolerated, as is inundation during the dormant period (late fall through early spring).

4. **Sun - Shade:** Sunlight and shade tolerance for each species.

   ❍ Full Sun - 6 or more hours of light per day or 4 hours of midday sun;
   ◗ Part Shade - 3 to 6 hours of light per day;
   ● Shade - less than 3 hours of light per day.

5. **Rate of Spread:** Relative rate of spreading of herbaceous species (Table 3), under ideal conditions.

   Slow: spreading at a rate <0.5 ft. per year.
   Fast: spreading at a rate of ≥0.5 ft. per year.